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OWEN'S COMPARATIVE ANATOMY OF VERTEBRATES, VOL. III.*

THE publication of the third and concluding portion of Prof. Owen's great anatomical work is unquestionably an event which marks an era in anthropological science. We have already laid before our readers our observations on the two earlier volumes, and we shall endeavour to point out the principal passages of the present volume which are of interest to anthropological students, as well as to the student of those higher biological problems, on the truth of which sound anthropology must depend.

The most important part of this third volume is unquestionably that in which Professor Owen "revendicates" for himself the honour of being for many years a staunch and consistent advocate of the origin of species by a slow process of derivation by secondary law. It has been too much the fashion amongst the pseudo-scientific men of the present day to represent Owen as a believer in the eternity of species, and to have been an advocate against transmutation, *i.e.* against the derivative law having operated in the production of living beings. He, however, so long ago as 1850 ("On Genus Dinornis," part iv, *Zool. Trans.*, vol. iv, p. 15), illustrated the operation of this law. He naturally met with opposition, and many of our readers will, no doubt, be surprised when they read the following passage, which was used by Professor Huxley in the year 1854.† We quote it at length:—

"The object he had in view was to point out the general arguments adduced by those theorists who contend that there has been a progressive development of life since the globe first became habitable, commencing with the simplest forms of organisation, and proceeding regularly upwards to the most complex, and then to show that such a view of creation is not compatible with the facts disclosed by geological researches. . . . . Mr. Huxley entered minutely into the differences exhibited in those fishes and in salmon, with a view to show that the development of an expanded tail could be traced anterior to the single tail of cartilaginous fishes, and, therefore, that this point on which progressionists have placed so much reliance entirely failed them. In several other respects also the organic remains in the lower series of rocks exhibit a higher degree of development than appears in animals of the same class in subsequent periods. Thus, though a superficial

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[*] *On the Anatomy of Vertebrates*, vol. iii. By Richard Owen, F.R.S., Superintendent of the Natural History Department of the British Museum, Foreign Associate of the Institute of France, etc. London: Longmans, 1868.

[†] Huxley *On Progressive Development of Life in time.* Royal Institution, 1855.

view of the successive classes of animal life may appear to sanction the opinions advocated in such works as the *Vestiges of Creation*, a more close examination dispels the notion of progressive development, and proves that it has no solid foundation."

When such opposition as this was led, not merely to "vestigism," but to any scheme of transmutation, or progressive development, it is not remarkable that a large proportion of our scientific men refrained from accepting the derivative theories of Owen. The publication of Darwin's work popularised a scheme of development which was as old as science. The principle of natural selection had little in it new, though much which was true, and had been previously demonstrated. The systems of Lamarck and the Vestiges, inaccurate though they may be, had a far more philosophical basis than modern Darwinism. To Lamarck especially is due our highest thanks, for having been the first to develope a theory of transmutation and progressive development, based on a semi-Lucretian foundation. Darwinism in 1869 has had already the test of nearly ten years' experience, and during that time has failed to acquire many more votaries than those which it acquired during the first few months of its existence. The reason of this is that it is merely a scheme, and not a μεθοδος: it is an hypothesis, not a theory, and, as such, will never be acceptable to strict scientific analysers. Fulsome adulators of Darwinism have compared his hypothesis with the Copernican theory: but there is really no higher scientific excellence in Darwinism than its sister sciences, mesmerism, phrenology, spiritualism, teetotalism, besique, or velocipedism; and there is a correlation between these sciences which is often presented by the leading Darwinists. Some Darwinists are phrenologists; some mesmerists; whilst the chief leaders are spiritualists. The reason why these somewhat equivocal sciences are connected in the mind of the same individual may not appear manifest, and we can only account for the fact that Mr. Wallace, *e.g.* is an eminent Darwinist, and a still more eminent believer in spiritual manifestations, on the theory of accidental correlation, *e.g.* that blue-eyed cats are generally deaf, and that short-beaked pigeons have small feet.*

But there has been a cry raised that Professor Owen is not sufficiently frank, not sufficiently liberal, and that he is in fact a representative of "official" and cautious science. This charge is most unjust. It comes especially unjustly when it is applied to a man, who even in the moral and mental corruption produced in the present day by pampering to the imaginary desires of the lower classes, has never, so far as we know, degraded himself or prostituted science by giving series of lectures to "working men," and has endeavoured to preserve science exact and truthful, whether or not it may be widely diffused. Yet it is suggested that the constant and habitual reticence which Professor Owen has always exercised proceeds from an indisposition to make public his thoughts, or to be on the unpopular side. We dissent entirely from these opinions. Nobody should proclaim anything to be true, or should teach, until his own mind is decidedly made up; and Owen, who has long advocated the derivative law, at a period prior to the publication of Darwin's work, should not be twitted with reluctance to express his conviction.

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* Darwin, *Origin of Species*, ed. 1861, p. 12.

It is certainly according to our interpretation of the laws of criticism both severe and unmerited to put a commentary on words which, on the face of them, do not advocate a certain theory by reference to the author's known opinions. Bolgeni, in an analogous case, says "Il dire che in quei casi niuno ha diritto d'interrogare; che le parole significano secondo la convenzione comune fra gli uomini; e cose simili, che da alcuni autori si dicono per esimere da peccato la bugia in quei casi; questo è un attaccarsi a ragione frivole, e soggette a molte repliche quando si ha la ragione evidente della citata impossibilità" [*Il Possesso*, c. 48]. Professor Owen's style is usually so thoroughly exact, that careless critics may slip into many pitfalls, if they do not entirely master the habitual language in which our great master inculcates his methods of thought, and always, not merely tells the whole verity, but avoids the error by which the incautious teacher prætergresses the limits, not merely of necessary truth, but of absolute verity. Many of his reviewers, however, do not appreciate the merits of a style which

> "Eluding, ne'er deludest,
> Nor deceiv'st, nor art deceived,
> But including, still excludest,
> Fully known, yet not perceived."

His style is not sufficiently "frank," not sufficiently gushing for them. It will not do for "working men," except for those who admit that "Si autem jurans dolum non adhibeat, obligatur secundum intentionem jurantis." The fact is, people in the nineteenth century are so little accustomed to have actual truth told them, that they think it looks mediæval.

Professor Owen, however, can confidently appeal to future generations, when his work the *Anatomy of Vertebrates*, will be read with profit and instruction by thousands of future students. The small jets of fluid which little beings may discharge on the corners of mighty monuments seldom affect the period during which the architecture may be preserved. The eloquent words of Dr. Ingleby, in his recently published *Introduction to Metaphysic*, may be here applied with great profit. He says:—

"The few whose faculties and leisure have been devoted to the abstractions of philosophy will have little fruition from an incommunicable discovery, or from a success which they can only celebrate 'like children sitting in the market-place.' Nevertheless, the few who, undismayed by the certainty of neglect, have made philosophy a life-long labour . . . will assuredly not keep silence, though their words are doomed to perish speedily, or to contend painfully and slowly with an outer darkness far more hopeless than that of the tomb."*

We now turn to the more especially anthropological parts of the work, and the first passage we shall notice is that which refers to the complexion of the races of men, in which certainly Professor Owen details his theory at considerable length.

"In the human subject the amount and colour of the subcuticular pigmental cells relate, but not absolutely as regards existing continents and peoples, to the degree of solar influence to which the skin is exposed. A fair complexion and light hair do not characterise any race indigenous to tropical and warmer temperate latitudes, but are limited to cooler temperate and warm climes, which, from the present excess of dry land in that hemisphere, are northern or arctic. The continent of Europe, if the complexion of its people be compared from Scandinavia to the Mediterranean, exemplifies the progressive deepening of the tints of skin, hair, and eyes, as the sun exerts more power. But the Asiatic part of the old world shows this relation to a minor degree. The aborigines of Northern Asia to Kamtschatka are like the Japanese of a brownish-yellow complexion; the same prevails through all the latitudes of the vast Chinese empire; but the southern extensions of that people into Cochin China, Siam, and Burma, do show a deeper brown. The Hindoos retain the same almost black tint over a range of twenty-six degrees of latitude and twenty four degrees of longitude; but these are tropical, or nearly so. The Malays of the Indian Archipelago preserve the same deep brown tint over eighteen degrees of latitude, reckoned from the equator northward, and the tint would seem still to relate to such excess of solar influence; although the sway of other causes is exemplified by the darker Mincopies, Cingalese, and Hindoos, under similar influences. Still more strikingly is this shown by the blackness of the Melanian aborigines of New Guinea, Australia, and Tasmania, retained from the sixth to the forty-third degree of south latitude; and especially of those of the outlying islands in proximity with others inhabited by the olive brown Polynesians, whose complexion prevails from lat. 12° south to 46° south (New Zealand). But the most instructive example of the chosen relationship of tint to race than to climate is afforded by the aborigines of the New World, which hold nearly the same depth of copper-brown or reddish tint, latitudinally from Tierra del Fuego to Hudson's Bay, and longitudinally from the Atlantic to the Pacific. The contrast between the South American Indians and the African Negro would seem to be decisive against the hypothesis of degrees of solar influence being the causes of degrees of darkness of complexion. But there is an element in the problem which ought to be taken into consideration, viz. *time*. If Africa be an older continent than South America, its aborigines may have been subjected to solar influences through a longer series of generations. We know not the extent of such series; some may deem that were the intertropical South American Indians subject to a vertical sun during the long ages of Africa's emersion, they would acquire a darker complexion. Climate, however, depends on other influences than sunshine. Degrees of moisture, and whatever influences cause a contrast or gradation of seasons, etc., may have their influences upon complexion. Filthy habits, foul air, and bad food affecting biliary and other secretions, have their share in darkening the skins or sallowing the complexions of the Esquimaux, Fins, and Laps, *e.g.* as compared with the cleanlier and more healthily living and better nourished Scandinavians residing some degrees further from the pole. But assuming, as the general result of the above survey of human complexions, that such complexions do, in the main, show a certain dependent relationship on solar light and heat, and postulating the effect of long periods of such subjection, we might then be led to conclude the darkest of the intertropical and warm temperate peoples to be the oldest; that the Melanians, scattered on islands to the east of the Indian Ocean, inhabit relics of a continent, as old as, perhaps older than, Africa; and that the lighter-tinted races on intercalated or contiguous portions of dry land are subsequent immigrations or derivatives from lands less affected by solar influences. On this hypothesis it may be inferred that the deepest tinted races existing in the islands of the Malayan Archipelago are the oldest inhabitants of such—those most entitled to be termed aborigines. The Hindoos, by the same pigmental test, would be deemed older than the Parsee or Mohammedan natives of Hindostan, as history indeed testifies. In extratropical latitudes human generations may have succeeded each other for the same duration of time as in tropical ones, without further deepening or development of pigment than such diminishing influence of the sun may effect. Such peoples, migrating to tropical countries, may long maintain their inherited complexions; just as the black races migrating to extratropical latitudes long retain the tint inherited from forefathers in whom it has been established primarily by the requisite continuance of exposure to extreme solar heat and light" (p. 614-616, vol. iii).

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* *Loc. cit.*, p. 206.

The passages in Professor Owen's work which relate to the muscular system of man and the apes should be read with the greatest care, as they are conceived in a most exact spirit. We especially commend to our readers the diagram in which the muscular systems of the foot of man and the gorilla are placed side by side, and the important distinction between the tendons very well shown. This distinction it has been of late years the fashion to ignore, and was the subject of an animated discussion between Messrs. Rolleston and Carter Blake at the Newcastle meeting of the British Association

(1863). The facts which Mr. Carter Blake then asserted have been amply corroborated by Professor Owen's description in the present work; and if Professor Rolleston reads the passage cited, he, perhaps, will see that his charges were not merely intemperate, but inaccurate. The voice of contemporary science has long since rectified the matter. With regard to the nervous system, Professor Owen's researches are of the most important character. He collects and incorporates in the present work a large amount of the notes of his Hunterian courses of lectures before the Royal College of Surgeons many years ago, in which the characters of the gyri, sulci, and convolutions are most carefully described. We think that every F.A.S.L. who is a student of the characters, anatomical, physiological, psychological, of the human brain should read Professor Owen's analysis of the method by which, taking the lowest and most smooth-brained gyrencephale as a starting point, the convolutions of the brain are *seriatim* developed, till at last we reach man. Professor Owen suggests a new classification of the cerebral folds, arranged in the order of their constancy in mammals, and differing from those of Rolando, Leuret, Gratiolet, and Broca, the three first of which he exhibits in parallel columns to his own, in a very lucid table on his 137th page. There are in all forty-five cerebral folds and forty-five cerebral fissures described by him. He notes all fissures by numbers, and all folds by letters, as in his memoir on the Anatomy of the Cheetah (1833). This system is highly convenient, although as Professor Owen points out, the "mode of notation has been reversed by a subsequent author, but no advantage from the innovation is pointed out, or seems to be gained thereby."

The chapter with regard to development needs also to be carefully studied, as it places the reader entirely on a level with the latest researches of the recent German embryologists on this most difficult and most complicated point of biology. We trust that no one will criticise either this chapter, or that on "general conclusions," who has not read and thoroughly comprehended the whole three thick volumes which precede. If anyone skips Professor Owen's facts, and flies at once to his 821st page of vol. iii, he probably will be somewhat puzzled. Metaphysics and theology are alike discussed therein, and Professor Owen deems it his duty to expound his belief on the relation between physiology and theology. The following passages we think are plain enough, and we commend them to our readers as evidence that Owen is not deterred by what has been justly called "weak Exeter Hall drivel"* from expressing his full belief. He says:—

"I am most averse to travel beyond my proper province; but a general physiological conclusion from the phenomena of the nervous system inevitably brings on collision with a dogmatic affirmation or definition of the cause of the highest class of those phenomena instilled as an article of religious faith into fellow Christians, and on which is based their mode of thought affecting dearest hopes and highest aspirations. . . . If the hypothesis that an abstract entity produces psychological phenomena by playing upon the brain as a musician upon his instrument, producing bad music when the fibres or cords are out of tune, be rejected, and these phenomena be held to be the result of cerebral actions, an objection is made that the latter view is 'materialistic' and adverse to the notion of an independent, indivisible 'immaterial' mental principle or soul. What 'materialistic' means in the mind of the objector I nowhere find intelligibly laid down ; but it is generally felt to be something 'inconsistent with, or shaking, the foundations of an article of faith,' as Stillingfleet would have said" (p. 821).

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* *Tablet*, March 20th, 1869.

"In the endeavour to clearly comprehend and explain the functions of the combination of forces called 'brain,' the physiologist is hindered and troubled by the views of the nature of those cerebral forces which the needs of dogmatic theology have imposed on mankind" (p. 823).

"If the physiologist reject the theological sense to the term 'life' without giving cause for the charge of unsoundness in religious principles, does he lay himself more open to the charge by rejecting also the theologian's meaning of the term 'spirit,' of the term 'soul,' of the term 'mind,' and we might add of 'sin' or 'death?'" (p. 824.)

"We know of nothing more 'material' than the 'centres of force,' our ideas of things without as within the 'ego' are the action and reaction of forces, as 'material' or 'immaterial' as the ideas themselves" (p. 824).

In the above passages the trumpet gives out no uncertain sound, and the meaning of the author is clearly expressed without any regard to the value of popular beliefs or to the mere evanescent prejudices of the nineteenth century. No fear of odium has here deterred Owen from "showing his colours."

Professor Owen may, perhaps, feel that, after he has taught, not merely anthropotomy, but the groundwork on which anthropological science is based, that a new generation of unscientific and semiscientific men may neglect his teaching and disown his doctrines. He has never been a "fashionable" teacher. Yet, when he contemplates the little energy and the feeble amount of vital force, which it is necessary to expend to become a teacher of modern English science, he may, perhaps, as many anthropologists now do, recall the words of Thiers (*Histoire de la Révolution*, p. 512) :—"Depuis ces temps où Tacite la vit applaudir aux crimes des empereurs, la vile populace n'a pas changé. Toujours brusque en ses mouvements, tantôt elle élève l'autel de la patrie, tantôt elle dresse des échafauds, et n'est belle et noble à voir, que lorsque, entrainée dans les armées, elle se précipite sur les bataillons ennemis." Teachers of comparative anatomy have little to hope or to fear from the epidemic disease termed "public opinion."

INAUGURAL ADDRESS TO THE PSYCHOLOGICAL ASSOCIATION OF GLASGOW.*

By J. W. Jackson, Esq., F.A.S.L., President.

Psychology may be defined as the science of the inner life of mind in contradistinction to the outer life of the body, with its subdivisions of anatomy or structure, physiology or function, pathology or disease, and we may, perhaps, add hygiene or health. Psychology also has its subdivisions. There is the mind in its normal and abnormal condition; in vigilance, in somnolence, in exaltation, and in derangement, with the experiences peculiar to each. And lastly, there is comparative psychology, embracing the mental constitution of the various races of men, and the different species of animals—a rather extensive programme, as will be seen when we come to fill up this bare outline with its appropriate details. Let us glance at some of these.

There is mind in its normal condition, and as all our experiences of this have been in connection with a corporeal structure, one of the first subjects for our investigation is the nature and extent of this connection. Is mind necessarily, and so always, united with a physical organisation as an unavoidable condition, if not of its existence, then, at least, of its manifestation? And, if so, then to what extent and in what manner is it dependent upon this organisation? Are our mental operations merely a function of our corporeal structure, or is the latter simply an instrument provided for, and, in a sense, developed by the former? And, in either case, to what extent is corporeal structure indicative of mental endowment? Here we are brought face to face with phrenology, physiognomy, the psychognomy of the hand, and those other real or pseudo branches of science that profess to afford a diagnosis of character from corporeal indications. Is there any truth in these things, and, if so, to what extent is it mingled with error in the present state of these interesting, though scarcely recognised, departments of inquiry?

Then we have mind in its normal condition of vigilance, with its powers of perception, memory, reflection, and imagination; its moral

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* Delivered February 23, 1869.